IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A film forming method, comprising the steps of:

forming a F-doped carbon film by using a source gas containing C and F; and

after the forming the F-doped carbon film, modifying a chemical composition of said F-doped carbon film with ~~nitrogen~~ radicals consisting of Ar and nitrogen, wherein

said source gas has a F/C ratio larger than 1 and smaller than 2, the F/C ratio being defined as a ratio of a number of F atoms to a number of C atoms in a source gas molecule.

Claim 2 (Previously Presented): The film forming method as claimed in claim 1, wherein said modifying step removes F atoms terminating an exposed surface of said F-doped carbon film.

Claim 3 (Canceled).

Claim 4 (Previously Presented): The film forming method as claimed in claim 1, wherein said radicals are excited by a microwave plasma.

Claim 5 (Original): The film forming method as claimed in claim 4, wherein said microwave plasma is formed by introducing a microwave into a processing space in which said F-doped carbon film is formed by a planar microwave antenna via a microwave window that forms said processing space.

Claim 6 (Previously Presented): The film forming method as claimed in claim 1, wherein said source gas includes any of C_3F_4, C_4F_6 and C_5F_8.

Claim 7 (Original): The film forming method as claimed in claim 1, wherein said source gas is free from a hydrogen gas component.

Claim 8 (Previously Presented): The film forming method as claimed in claim 1, wherein said F-doped carbon film is formed by a plasma CVD process that uses the source gas containing C and F.

Claim 9 (Previously Presented): The film forming method as claimed in claim 8, wherein said plasma CVD process is conducted by dissociating said source gas by a microwave plasma.

Claim 10 (Previously Presented): A method of fabricating a semiconductor device, comprising the steps of:

depositing a F-doped carbon film on a substrate by a plasma CVD process that uses a source gas that contains C and F in a molecule thereof;

forming an opening in said F-doped carbon film by a dry etching process of said F-doped carbon film; and

covering a sidewall surface and a bottom surface of said opening by a metal film, wherein

there is provided, after said step of forming said opening but before said step of covering said sidewall surface and bottom surface of said opening by said metal film, a step of modifying a chemical composition of at least said sidewall surface of said opening with nitrogen radicals consisting of Ar and nitrogen, said source gas having a F/C ratio larger than 1 and smaller than 2, the F/C ratio being defined as a ratio of a number of F atoms to a number of C atoms in said source gas molecule.

Claim 11 (Previously Presented): The method for fabricating a semiconductor device as claimed in claim 10, wherein said radicals in said modifying step are excited by a microwave plasma.

Claim 12 (Previously Presented): The method for fabricating a semiconductor device as claimed in claim 10, wherein said step of depositing said F-doped carbon film further comprises a step of forming a hard mask film on a surface of said F-doped carbon film,

said step of depositing said F-doped carbon film and said step of forming said hard mask film are conducted respectively in first and second processing chambers coupled to a first vacuum transfer chamber, and

said step of forming said opening and said step modifying step are conducted respectively in third and fourth processing chambers coupled to a second vacuum transfer chamber.

Claim 13 (Withdrawn): A substrate processing system, comprising:

a vacuum transfer chamber;

a first processing chamber coupled to said vacuum transfer chamber for conducing a dry etching of a fluorine-doped carbon film;

a second processing chamber coupled to said vacuum transfer chamber for modifying a fluorine-doped carbon film;

a third processing chamber coupled to said vacuum transfer chamber for conducting dry cleaning of a fluorine-doped carbon film; and

a fourth processing chamber coupled to said vacuum transfer chamber for conducting deposition of a metal film,

wherein each of said first and second processing chambers comprises:

a processing vessel coupled to an evacuation system and having a stage for holding a substrate to be processed;

a microwave window provided so as to face said substrate to be processed on said stage and constituting a part of an outer wall of said processing vessel;

a planar microwave antenna provided outside said processing vessel in coupling to said microwave window;

a first gas supply system for supplying a noble gas to an interior of said processing vessel; and

a second gas supply system provided in said processing vessel so as to divide a space inside said processing vessel into a first space part in which said microwave window is included and a second space part in which said stage is included, said second gas supply system being formed with an opening enabling invasion of plasma formed in said first space part into said second space part.

Claim 14 (Currently Amended): A method of fabricating a semiconductor device, comprising the steps of:

depositing a fluorine-doped carbon film on a substrate by a plasma CVD process that uses a source gas that contains C and F in a molecule thereof;

forming an opening in said fluorine-doped carbon film by a dry etching process; and

depositing a first metal film so as to cover a sidewall surface and a bottom surface of said opening, wherein

there is provided, after said step of forming said opening but before said step of depositing said first metal film, a step of ~~depositing a second metal film that forms~~ forming a stable compound of a metal fluoride ~~when reacted~~ by depositing a second metal film that reacts with F, such that said second metal film covers at least said sidewall surface and

bottom surface of said opening, and

said source gas has a F/C ratio larger than 1 and smaller than 2, the F/C ratio being defined as a ratio of a number of F atoms to a number of C atoms in the source gas molecule.

Claim 15 (Previously Presented): The method of fabricating a semiconductor device as claimed in claim 14, wherein said second metal film is selected from a group including Al, Ru, Ni, Co, Pt, Au and Ag.

Claim 16 (Withdrawn): A semiconductor device, comprising:

a substrate;

a fluorine-doped carbon film formed over said substrate;

an opening formed in said fluorine-doped carbon film;

a first metal film formed so as to cover at least a sidewall surface and a bottom surface of said opening, wherein

there is formed, between said fluorine-doped carbon film and said first metal film, a second metal film so as to cover said sidewall surface and bottom surface of said opening, there being formed a fluoride film in said second metal film along an interface to said sidewall of said opening where said fluorine-doped carbon film is exposed.

Claim 17 (Withdrawn): The semiconductor device as claimed in claim 16, wherein said opening exposes a copper interconnection pattern at a bottom part thereof, and wherein said second metal film forms an alloy containing Cu along an interface to said copper interconnection pattern.

Claims 18 and 19 (Canceled).

Claim 20 (Previously Presented): The film forming method as claimed in claim 1, wherein said modifying step modifies said F-doped carbon film by a coupling of nitrogen atoms to said film.

Claim 21 (Previously Presented): The method for fabricating a semiconductor device as claimed in claim 10, wherein said modifying step modifies said F-doped carbon film by a coupling of nitrogen atoms to said film.